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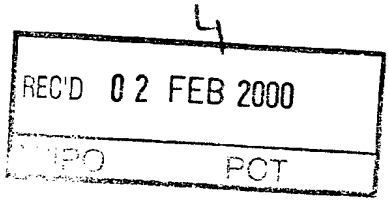

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Hakijan nimi on hakemusdiaariin **05.12.1999** tehdyn nimenmuutoksen jälkeen **Nokia Networks Oy.**

The application has according to an entry made in the register of patent applications on **05.12.1999** with the name changed into **Nokia Networks Oy.**

Täten todistetaan, että oheiset asiakirjat ovat tarkkoja jäljennöksiä patentti- ja rekisterihallitukselle alkuaan annetuista selityksestä, patenttivaatimuksista ja piirustuksista.

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CONTROL OF A MULTICALL IN A TELECOMMUNICATIONS SYSTEM

Field of the Invention

The invention relates to a call control of a multicall in telecommunication systems, and particularly in wireless telecommunications systems.

Background of the Invention

Wireless communications system refers generally to any telecommunications system which enable a wireless communication between the users and the network. In mobile communications systems users are capable of moving within the service area of the system. A typical mobile communications system is a Public Land Mobile Network (PLMN).

At present third generation (3G) mobile systems, such as Universal Mobile Communication System (UMTS) and Future Public Land Mobile Telecommunication System (FPLMTS) later renamed as IMT-2000 (International Mobile Telecommunication 2000), are being developed. The UMTS is being standardized in ETSI (European Telecommunication Standards Institute) whereas ITU (International Telecommunication Union) is defining the IMT-2000 system. The radio interface is likely to be based on a wideband CDMA (code division multiple access), and therefore the third generation systems are often referred to as Wideband CDMA systems (WCDMA).

It has been suggested that future 3G systems shall support multiple simultaneous, independent, calls to/from a single mobile station.

A problem with the prior publications related to 3G systems is that handling of multiple calls is only specified on a "should-be possible" level. In other words, the prior publications almost completely ignore the management details of multicalls to/from a single mobile station. In a second generation (2G) system, such as the GSM (the Global System for Mobile communication), there is one situation where a mobile station may have two calls. Such a situation may arise if the subscriber has a supplementary service (SS) called Call Hold (CH). However, a 2G mobile station does not have multiple independently-controlled bearers (i.e. traffic channels), and in a CH situation, only one call can be active and the other one is put on hold. Even in the so-called high-speed data transfer (HSCSD), a mobile station uses several time slots but all the time slots are assigned to a common traffic channel.

Disclosure of the Invention

For convenience, the term 'multicall' will be used to describe multiple, independent, simultaneous calls to/from a single mobile station using multiple independently-controlled traffic channels. Some of the calls can be mobile-originated (MO) calls and some can be mobile-terminated (MT) calls. An object of the invention is to provide call control mechanisms for supporting such multicalls. The user of the mobile station should be able to receive and place new calls independently of ongoing calls. Another object of the invention is to preserve at least some of the current 2G supplementary services as far as reasonable in the 3G systems as well as enable multicall handovers between the 2G and 3G systems.

An aspect of the invention is a method of controlling a multicall in a telecommunications system over a transmission path between a telecommunications network and a subscriber terminal, said method comprising the steps of

setting up any new call in an existing multicall, according to a criterion, either by

(i) setting up said new call on a new bearer, or

(ii) setting up said new call on an existing bearer so that said existing bearer is shared by at least two calls.

Another aspect of the invention is a telecommunications system comprising an arrangement method of controlling a multicall over a transmission path between a telecommunications network and a subscriber terminal, and wherein the network is arranged to set up any new call in an existing multicall, according to a criterion, either by

(i) setting up said new call on a new bearer, or

(ii) setting up said new call on an existing bearer so that said existing bearer is shared by at least two calls.

A further aspect of the invention is a subscriber terminal for a telecommunications system, said terminal being capable of having a multicall over a transmission path between a telecommunications network and a subscriber terminal, wherein the terminal is arranged to be able to indicate at a setup stage of a new call in an existing multicall, whether said new call is setup on a new bearer or on an existing bearer so that said existing bearer will be shared by at least two calls.

A multicall according to the present invention may have three differ-

ent bearer configurations: each call of the multicall has a dedicated bearer, or one bearer is shared by all calls of the multicall, or the multicall has both dedicated and shared bearers. When a shared bearer is used, user can have several independent calls in parallel which have to alternate the use of the bearer, or in some situations, use it simultaneously.

In an embodiment of the invention the mobile user is able to, if network conditions or circumstances allow, to control whether a dedicated bearer mode or a shared bearer mode is used for a call, the network can not force the use of either mode. The user of a subscriber equipment may indicate at call setup whether a new dedicated bearer is needed for a new call or whether an existing bearer, and which one, shall be used and shared with one or more existing calls. According to an other embodiment the network may, in some situations, suggest, or even force, the call to some bearer configuration. An example of this is an incoming data call, which should be offered to the user as a dedicated bearer call (Call Hold not allowed for data calls). Another example is if the use of multicall is limited, e.g. due to 3G-2G interworking; it saves unnecessary signalling if the network already in the setup indicates which options are available.

In an embodiment of the invention the sharing of a common bearer is carried out by means of a call hold mode (CH): when the user puts a call on hold the traffic bearer is removed from the call to be used by other calls. As a consequence, one of the calls on that bearer is in a active mode and the other call(s) in a hold mode. In this case, if an existing bearer is selected at call setup of a new call, the call(s) which use the bearer to be shared must be put on hold before the new 'sharing' call is initiated.

In an embodiment of the invention is that the user is able to toggle the call between the dedicated bearer mode and the shared bearer mode, if desired, i.e. it is possible to change the serving bearer in/during a call.

The basic principle of this invention is that the call control protocol will be enhanced, so that the bearer, which is subject of the call control procedure in progress, is addressed. The invention also provides means to change the associations between calls and bearers in the multicall. This enables a flexible and effective use of the bearer resources according to the circumstances and users and/or networks preferences at each specific moment. For example, when having one bearer and two calls, one of which is active and the other on hold, the user may establish a new bearer and move the call on hold

to the new bearer and vice versa. The user may also move a call from one bearer to another. Likewise, when having two speech calls on two parallel bearers, the subscriber may merge the calls to a conference call.

The invention also enables a third generation mobile communications system to support and interact with at least call waiting (CW), and call hold (CH), or multiparty call (MPTY) supplementary services (SS) of a 2G mobile communications system, such as the GSM.

With the introduction of multicall in 3G the need for the CH and MPTY SSs diminishes, because it is possible to implement the corresponding functionality in the terminal. An advantage of implementing these functions in the terminal is the non-existent need for standardization of these services, which enables the mobile terminal manufacturers to independently and flexibly develop these services and the corresponding user interface in the terminal.

There is, however, a requirement to preserve the GSM SSs in 3G. Support of UMTS-GSM interworking and handovers, GSM evolution, GSM user conventions etc. are reasons for this requirement. In the case of CH and MPTY one important reason is the capacity, instead of allocating one bearer per (peer) call party all calls use the same bearer.

This coexistence of CH/MPTY-services and multicall poses a new problem in 3G; i.e. which mode of operation call control procedures concern. An example is when the mobile user sets up a new call, does she want the new call to use an existing bearer or a new independent bearer to be allocated. This invention addresses, and solves, this problem.

The invention further enables an inter-system handover between the 2G and 3G systems.

Brief Description of the Drawings

In the following the invention will be described in greater detail by means of the preferred embodiments with reference to the accompanying drawings, in which

Figure 1 shows a simplified architecture of a 3G mobile system,

Figures 2A and 2B illustrate different architectures allowing an interoperation of 2G and 3G mobile systems,

Figures 3A, 3B and 3C illustrate a 2G multicall with a shared bearer, a 3G 'pure' multicall with dedicated bearers and a 3G multicall with dedicated and shared bearers, respectively.

Preferred Embodiments of the Invention

The preferred embodiments of the invention are in the following described as implemented in a third generation (3G) mobile communications system, such as UMTS system. The invention is, however, applicable to be used in any telecommunication system.

Fig. 1 shows a simplified 3G architecture. The 3G mobile station MS communicates via a 3G Radio Access Network RAN with a 3G Mobile Switching Centre (3G-MSC). The 3G MSC is interworking with (an) other telte-communications network(s), such as Public Switched Telephone Network PSTN or Public Land Mobile Network PLMN.

In Fig. 1 a communication link is established between the MS and a peer terminal in the PSTN/PLMN. Also a simplified protocol layer structure is shown in order to facilitate the description of the present invention. The highest protocol layer is between the applications in the MS and the peer terminal. There may any number of speech and/or data calls between the applications. The call control protocol (CC) is one of the protocols of the Connection Management (CM) sublayer. The CM is the highest sublayer of Layer 3 in the 3G and 2G systems. The elementary procedures of call control protocol may be grouped into the following classes: call establishment procedures, call clearing procedures, call information phase procedures and miscellaneous procedures. In Fig. 1 the call control protocol employed between the MS and the 3G-MSC is referred to as a 3G-CC, and the call control protocol employed between the 3G-MSC and the peer terminal is referred to as a xCC. The lower layers include at least the transport layer and the transport layer control protocols.

The first operating 3G networks will be based on an interworking concept, where the 3G radio network is connected to 2G core network via an interworking unit IWU. Concerning CC (and Mobility Management MM) there are two alternatives to implement this concept, basically either a backward compatible approach where a second generation call control (2G-CC) is used between MS and 2G-MSC so that IWU relays the 2G-CC messages without further processing and provides interworking only on the lower layers, as shown in the Fig. 2A, or a 'full' IWU approach where the IWU performs mapping between the 3G and 2G messages, as shown in the Fig. 2B. The backward compatible approach is possible, since most mobile stations will probably be 3G-2G dual-mode stations, so they will anyway contain the 2G-CC. In the

'true' IWU alternative a single mode 3G mobile needs only 3G-CC.

In these different system architectures, every mobile station MS must support the 3G (or 2G) call control protocol in the circuit switched mode. The peer entity of the MS call control entity on the network side is the call control functionality in MSC. In the call control protocol, a dedicated CC entity is defined for each call. Each CC entity is independent from each other and shall communicate with the correspondent peer entity. Different CC entities use different transaction identifiers (TI).

As used herein the term bearer refers to a both-way or one-way and symmetric or an asymmetric connection between the mobile and the MSC or the peer end user. In the GSM specifications the corresponding term to bearer is channel, traffic channel and in some cases 'configuration'. Bearer negotiation refers to a procedure for reaching an agreement between the MS and the MSC on the properties of a new bearer or new properties of an existing bearer. The negotiation is basically formed by a question and an answer, a request for a bearer with specified properties and a positive or negative acknowledgement. In the GSM the definition of required bearer properties in a call is done with the Bearer Capability information element (BC_IE). In 3G-CC the BC_IE will have the same role. A bearer is identified by the Bearer Identifier (BID).

Multicall, i.e. several simultaneous, independent, calls to one MS, is a central new feature in 3G. As noted above, a call has CC peer entities in the MS and the MSC, which communicate via L3 CC messages. Each call has one connection, whose characteristics are given in setup message by means of the BC IE. The different calls of one terminal are independent in MSC. One call can be e.g. a normal speech call, or a fax or data call. A call can be also part of multimedia session. The collection and synchronization of all calls forming a multimedia session is done by the application in the terminal. Each independent call must have an identifier, such as a transaction identifier (TI) similar to that used in the GSM, for separating L3 CC message sequences of each other. The length of the TI may be one octet, for example, which will enable 256 simultaneous calls in one MS.

A basic assumption with 3G multicall have been that each call has one dedicated bearer, i.e. each new call (MO and MT) generates a new bearer, as illustrated in the Fig. 3B. Also in the GSM the L3 protocol architecture allows several parallel calls, the limitation being that there is only one traf-

fic channel, or bearer (in 3G terms), which the different calls share. This is facilitated by the CallHold and Multiparty supplementary services. With CallHold the calls alternate the use of the traffic channel, and Multiparty supplementary service the user data (which is always speech) is summed.

A 3G multicall according to the present invention may have three different bearer configurations: each call of the multicall has a dedicated bearer, or one bearer is shared by all calls of the multicall, or the multicall has both dedicated and shared bearers, as illustrated in the Fig. 3C. The "shared" 3G bearer mode may be based on call control procedures which are similar to those used in the GSM for the CallHold supplementary service.

When a shared bearer is used, user can have several independent calls in parallel which have to alternate the use of the bearer. The sharing may be carried out by means of a call hold mode (CH): when the user puts a call on hold the traffic bearer is removed from the call to be used channel. As a consequence, one of the calls on that bearer is in a active mode and the other call(s) in a hold mode. A user of a subscriber equipment indicates at call setup whether a new dedicated bearer is needed for a new call or whether an existing bearer, and which one, shall be used and shared with one or more existing calls. If an existing bearer is selected, the call(s) which use the bearer to be shared must be put on hold before the new 'sharing' call is initiated. A preferred feature of the invention is that the mobile user is able control, when the network conditions or circumtances allow, whether a dedicated bearer mode or a shared bearer mode is used for a call. However, at least in some situations it may be possible that the network may suggest, or even force, the use of either mode. Such as situation may be, for example, a specific parameter or information in the subscriber data or a load situation in the network or at the base station. It is also possible that network allocates a dedicated bearer to a data call by default, and the user may choose bearer mode only in the speech call setup. In the latter embodiment, it user may however be able to toggle the data calls between the shared and dedicated bearer modes. It is one preferred feature of the invention that the user is able to toggle the call between the dedicated bearer mode and the shared bearer mode, if desired, i.e. it is possible to change the serving bearer in/during a call.

In the following some examples are given of bearer negotiations for different call situations in a 3G system according to the present invention, when the bearer mode is primarily selected according to the users' preference.

Mobile Originated (MO) multicall

The basic call setup procedure may be very similar to those used in the 2G systems or proposed to the 3G systems. The following description concentrates only the features which relate to the implementation of the present invention. As normally, the MS may initiate a MO call setup by sending some kind of call setup message SETUP.

In the SETUP message the user of the mobile station may indicate for the network that a previously allocated bearer can be used instead of allocating a new bearer. The user must then identify the existing bearer which she wants to use, by indicating the respective bearer ID in the setup message. If the user wants a new bearer for a call, the bearer ID information element in the SETUP message is empty or contains a predetermined value, such as '1111', or the ID of an bearer which is not currently in use.

When the 3G network (the MSC) receives a call setup from the mobile station MS and the bearer ID element is empty or '1111', the network (by default) allocates a new bearer for the call. This applies always to the first call of the MS. Each allocated bearer is identified with a Bearer ID. The network selects the bearer ID sends it back to the MS in a CALL_PROCEEDING message, for example.

When the network receives a setup message with a bearer ID of an existing bearer, the network allocates this bearer to the call. Any existing call(s) which use(s) the bearer to be shared may be put on hold before the new 'sharing' call is initiated, if this feature is preferred.

The user may release a call from a shared bearer through a call release message which contains the transaction identifier TI of the call. The shared bearer is released when the last call using that bearer is released.

The user is able to toggle the call between the dedicated bearer mode and the shared bearer mode, if desired, i.e. it is possible to change the serving bearer in/during a call.

Changing 'bearer mode' going from 'dedicated bearer' mode to 'sharedbearer' mode and vice versa is needed in various sitations, e.g. when the network (or the user) wants to limit (decrease) the number of bearers. This can be done utilizing the existing (in GSM) MODIFY-procedure, by which bearer or call properties can be modified (negotiated) during the call. The MODIFY-procedure essentially consists of the modification request, the

MODIFY-message, and an acknowledgement, the MODIFY_COMPLETE-message. The change of bearer mode can be implemented by adding the Bearer ID to the MODIFY and the MODIFY_COMPLETE messages. When the user wants to associate the call with an existing bearer, the BID of this bearer is included in the MODIFY-message. If the user wants a new (dedicated) bearer to be allocated for the call, this can be indicated by giving the BID a certain value (e.g. '1111'). In all 'bearer reassociation' cases the MODIFY_COMPLETE-message can contain the result, i.e. the BID of the bearer which is associated with the call.

An alternative way to get a new bearer in a call is sending a setup message. In other words, the user sends a SETUP message with an active TI and an indication that a new bearer is requested, such as the bearer ID '1111. The network allocates a new bearer and separates the existing call from the shared bearer.

The user is able to put any call on any dedicated or shared bearer on hold by sending a hold activation message HOLD which contains the transaction identifier TI of the respective call. No bearer ID is required. When the network (e.g. MSC) receives the HOLD message, the network puts the call identified by the TI on hold, i.e. closes the user information path which relates to that call. It should be noted that when a call is on hold the CC peer entities of the call in the MS and in the network are maintained although the user information is not transferred. The call can be returned from the hold mode into the active mode by sending a hold deactivation message RETRIEVE which again contains the TI of the respective call.

In any one of the above cases the network may, according to some embodiments of the invention, force or suggest a bearer mode other than that requested by the user if the network conditions or other reason require this.

Mobile Terminated (MT) multicall

The basic call setup procedure may be very similar to those used in the 2G systems or proposed to the 3G systems. The following description concentrates only the features which relate to the implementation of the present invention. As normally, the 3G network (e.g. MSC) may initiate a MT call setup by sending some kind of call setup message SETUP to the MS. An alternative is to offer a new MT call to the MS having one or more active call, by

means of Call Waiting (CW) supplementary service.

The network operator may have certain preferences, which he should be able to promote. Therefore, in one embodiment of the invention, network can indicate or suggest in the incoming SETUP message the which bearer will be used. A new bearer may be indicated with a certain value, such as ('1111').

The MS responses to or acknowledges the SETUP message or the CW by sending some kind of response message(s) in the call setup procedure, such as CALL_CONFIRMED or CONNECT_Ack. Any such response message or other message can be utilized by user of the mobile station may indicate for the network that a previously allocated bearer can be used instead of allocating a new bearer, in a similar manner as described above with respect to the MO call. In other words, the user must identify the existing bearer which she wants to use, by indicating the respective bearer ID in the setup message. If the user wants a new bearer for a call, the bearer ID information element in the SETUP message is empty or contains a predetermined value, such as '1111'.

When the 3G network (e.g. the MSC) receives a message, such as CALL_CONFIRMED, from the mobile station MS and the bearer ID element is empty or '1111', the network (by default) allocates a new bearer for the call. This applies always to the first call of the MS. Each allocated bearer is identified with a Bearer ID. The network selects the bearer ID sends it back to the MS.

When the network receives a message, such as CALL_CONFIRMED, with a bearer ID of an existing bearer, the network associates this bearer to the call. Any existing call(s) which use(s) the bearer to be shared will be put on hold before the new 'sharing' call is initiated.

The user may release a call and toggle the call between the dedicated bearer mode and the shared bearer mode as well as between the hold mode and the active mode in a similar manner as described above with respect to the MO multicall.

In any one of the above cases the network may, according to some embodiments of the invention, force or suggest a bearer mode other than that requested by the user if the network conditions or other reason require this.

3G Multicall service interaction with 2G supplementary services

Some implications of multicall are that the user shall be able to receive calls independently of ongoing calls and to place new calls independently of ongoing calls. These requirements interact, or interfere, with certain situations occurring in some supplementary services.

The following Supplementary Services (SS) are triggered by 'user busy'-condition: Call Waiting (CW), Call Forwarding on Busy (CFU), and Call Completion to Busy Subscriber (CCBS). In addition the following Supplementary Services involve elements that may interact with multicall (e.g. multicall offers the possibility to implement the service in the MS): Multiparty Call (MPTY), Call Hold (CH), Explicit Call Transfer (ECT).

In the GSM there are two ways to express that the user is busy and can not receive calls. The User Determined User Busy (UDUB) condition occurs when the user rejects an offered call by responding to the received SETUP message with a CALL_CONFIRMED or RELEASE_COMPLETE message with cause "user busy". Alternatively the network (MSC) can determine that the (bearer) resources of the user are occupied – that is Network Determined User Busy (NDUB).

The available number of bearers in GSM is one, and NDUB occurs when this one bearer (connection) is occupied. In 3G the number there is no definite limit, and the ability of the user to handle simultaneous calls rather than the physical limits of the system should be the criteria.

In an embodiment of the invention the definition of Network Determined User Busy (NDUB) is changed to state that the maximum number of basic calls (not including Call Waiting calls) is a value N, which can be assigned e.g. on a per network element or per subscriber basis. In a further embodiment the maximum number of calls (N) can be given separately for each basic call type. This way it is possible e.g. to limit the number of parallel speech calls to one, but simultaneously have several (CS) data or fax calls active. User may indicate for the network the NDUP-limit and change the limit during the call.

Call Waiting means that an incoming call is offered to a busy user. In 3G the meaning or role of the CW changes from that in the GSM since multicall implicitly offers the corresponding functionality. However, since it is a clear requirement that CW shall be supported in 3G, the possible interaction

problems between multicall and CW has to be considered.

If the shared bearer mode is not used in the multicall and/or the NDUB is unlimited, the CW is not needed for offering a new call.

When shared bearer mode is used and the NDUB is limited, the network sets up new calls until the number of calls reaches the NDUB. After reaching the NDUB, the network may offer new calls by means of the CW. It is also possible to busy subscriber. This way CW works 'on top of' the multicall; both the multicall and the CW will function as they are expected.

In the 3G, when an incoming CW call is allowed, the maximum number of bearers is already in use. The user must choose (if he has more than one active call) a call to put on hold and accept the new call with the indication which bearer to use. The user may be able to determine from the received information whether the newly offered call is a speech call or a data call. If the call is a data call, it is not normally reasonable to put the call on hold.

3G multicall presents the possibility to implement multiparty call in the MS, i.e. combining the speech paths of separate two 'dedicated bearer' calls in the terminal. This, however, leads to (unnecessary) waste of resources since it maintains two (or more) speech paths over the air.

In the GSM a multiparty call is initiated from one active and one held call, which both share the same bearer. In 3G it must be possible to join at least two 'dedicated bearer' multicalls into a multiparty call. This can be done by means of changing one of the calls from a dedicated bearer to share the bearer of the other call according to the principles of the invention so that both calls will be in a shared bearer mode, one active and one on hold. If the multiparty call is to be established for calls already in the shared bearer mode this step will naturally be omitted. In the shared bearer mode the Multiparty service can be initiated just like in GSM (sending a FACILITY message referring to TI of either call with BuildMPTY indicator). As a result the 2G multiparty call supplementary service can be fully supported in the 3G system.

In case of 3G-2G dual-mode stations also intersystem handovers are available which may change the available bearer capabilities and the service level offered by the network.. The present invention allows a handover of a multicall from a 3G system to a 2G system, such as GSM. This is achieved by putting all calls (irrespective of whether they have been in a dedicated bearer mode or a shared bearer mode) of the multicall on a common

shared bearer prior to the handover. One of the calls will be active and other(s) on hold. However, data calls are not normally put on hold but released prior to the handover. Then the handover of the multicall can be carried out in similar manner as an internal handover in the 2G system. In the 2G system the multicall continues on a shared bearer with one call active and other(s) on hold.

The application has above been described by means of the preferred embodiments to illustrate the principles of the invention. Regarding the details the invention may vary within the scope and spirit of the accompanying claims.

CLAIMS

1. A method of controlling a multicall in a telecommunications system over a transmission path between a telecommunications network and a subscriber terminal, **c h a r a c t e r i z e d** by the step of

setting up any new call in an existing multicall, according to a criterion, either by

(i) setting up said new call on a new bearer, or

(ii) setting up said new call on an existing bearer so that said existing bearer is shared by at least two calls.

2. A method according to claim 1, wherein the decision whether the new bearer is required or whether said existing bearer is to be used is made by the network according to said criterion.

3. A method according to claim 1 or 2,wherein said criterion is a preference of a user of said subscriber terminal.

4. A method according to claim 1 or 3, comprising a step of

indicating in a call setup signalling from said subscriber equipment to said network whether the new bearer is required or whether said existing bearer is to be used..

5. A method according to claim 1, 2 or 3, comprising a step of

indicating in a call setup signalling which existing bearer is to be used.

6. A method according to claim 5, wherein said step of indicating comprises a step of

indicating in the call setup signalling the bearer ID of the existing bearer which is to be used.

7. A method according to any one of claims 1 to 6, comprising a step of

allocating by the network a dedicated bearer for the new call by a default if the user does not in the call setup indicate any existing bearer to be used.

8. A method according to any one of claims 1 to 7, comprising a step of

changing a call currently being on a shared bearer to use a new dedicated bearer.

9. A method according to claim 8, wherein said step of changing comprises the steps of

sending, from the subscriber equipment to the network, a call setup message containing a transaction identifier of said call currently on the shared bearer and an indication that a new dedicated bearer is requested,

allocating, by the network in response to said call setup message, a new dedicated bearer and transferring the call indicated by the transaction identifier received to said allocated bearer.

10. A method according to any one of claims 1 to 9, comprising a step of

changing a call currently using a dedicated bearer to use another bearer shared with al least other call.

11. A method according to claim 10, wherein said step of changing comprises the steps of

sending, from the subscriber equipment to the network, a call setup message containing a transaction identifier of said call having the dedicated bearer and a bearer ID indicating the shared bearer to be used,

transferring, by the network in response to said call setup message, the call indicated by the transaction identifier received to said existing bearer.

12. A method according to any one of claims 1 to 11, comprising a step of

putting an existing call on an existing bearer of said multicall into a hold mode prior to setting up said new call on said existing bearer.

13. A method according to any one of claims 1 to 12, comprising a step of

alternating by the user the calls on a shared bearer between an active mode and said hold mode.

14. A method according to claim 13, wherein said alternating comprises a step of

sending a hold message containing a transaction identifier of a call in order to put the respective call on hold.

15. A method as claimed in any one of claims 1-14, comprising a step of

offering a new subscriber equipment terminating call to the user always by means of a call waiting supplementary service.

16. A method as claimed in any one of claims 1-14, comprising a step of

offering a new subscriber equipment terminating call to the user by

means of a call waiting supplementary service only when a maximum allowed number of the bearers is already used by the multicall.

17. A method according to any one of claims 1-16, wherein said telecommunications system comprises two telecommunications networks of different generations, the first one of the telecommunications networks supporting both shared bearers and dedicated bearers for a multicall, and the second one of the telecommunications networks supporting only the shared bearers for a multicall, and said method comprises an inter-network multicall handover having the steps of

putting any calls to be handed over, irrespective of whether they have been in a dedicated bearer mode or a shared bearer mode, of the multicall on a common shared bearer in said first network prior to the handover,

carrying out of said multicall having said common shared bearer to a shared bearer in said second telecommunications network.

18. A telecommunications system comprising an arrangement of controlling a multicall over a transmission path between a telecommunications network and a subscriber terminal, **characterized** in that the network is arranged to set up any new call in an existing multicall, according to a criterion, either by

(i) setting up said new call on a new bearer, or

(ii) setting up said new call on an existing bearer so that said existing bearer is shared by at least two calls.

19. A system according to claim 18, wherein the decision whether the new bearer is required or whether said existing bearer is to be used is made by the network according to said criterion.

20. A system according to claim 18 or 19,wherein said criterion is a preference of a user of said subscriber terminal.

21. A system according to claim 18, 19 or 20, wherein a call setup signalling from said subscriber equipment to said network contains an indication whether the new bearer is required or whether said existing bearer is to be used..

22. A system according to any one of claims 18-21, wherein said call setup signalling contains an indication which existing bearer is to be used, preferably the bearer ID of the existing bearer which is to be used, and wherein the network is arranged to allocate a dedicated bearer for the new call by a default if no indication of any existing bearer to be used is received in

said call setup signalling.

23. A system according to any one of claims 18-22, wherein

the subscriber equipment is arranged to send to the network a call setup message for changing a call currently being a shared bearer to use a new dedicated bearer, said message containing a transaction identifier of said call and an indication that a new dedicated bearer is requested,

the nerwork being responsive to said call setup message, for allocating a new dedicated bearer and transferring the call indicated by the received transaction identifier to said allocated bearer.

24. A system according to any one of claims 18-23, wherein

the subscriber equipment is arranged to send to the network a call setup message for changing a call currently using a dedicated bearer to use another bearer shared with al least other call, said message containing a transaction identifier of said call having the dedicated bearer and a bearer ID indicating the shared bearer to be used,

the nerwork being responsive to said call setup message for transferring the call indicated by the transaction identifier received to said existing bearer.

25. A system according to any one of claims 18-24, wherein

the network is arranged to offer a new subscriber equipment terminating call to the user by means of a call waiting supplementary service on a shared bearer either always or only when a maximum allowed number of the bearers is already used by the multicall.

26. A system according to any one of claims 18-25, comprising a step of

putting an existing call on an existing bearer of said multicall into a hold mode prior to setting up a new call.

27. A subscriber terminal for a telecommunications system, said terminal being capable of having a multicall over a transmission path between a telecommunications network and a subscriber terminal, **characterized** in that the terminal is arranged to be able to indicate at a setup stage of a new call in an existing multicall, whether said new call is setup on a new bearer or on an existing bearer so that said existing bearer will be shared by at least two calls.

28. A subscriber terminal according to claim 27, wherein said terminal is a mobile station for a mobile communications system.

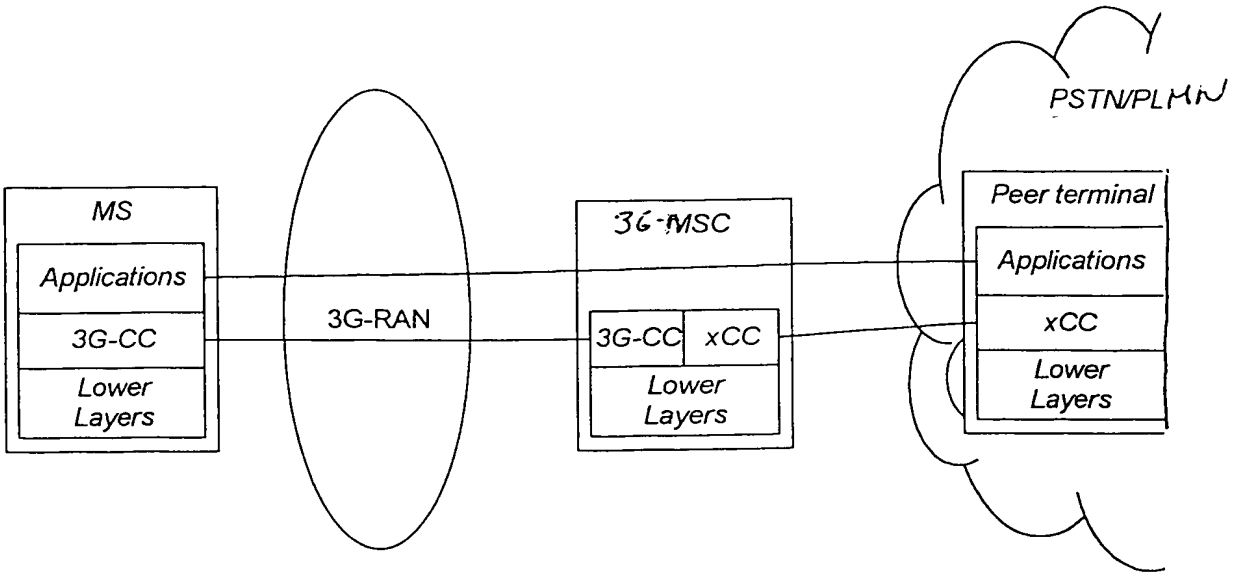

PSTN/PLMN
MS
Applications
3G-CC
Lower Layers
3G-RAN
3G-MSC
3G-CC
xCC
Lower Layers
Peer terminal
Applications
xCC
Lower Layers

FIG. 1

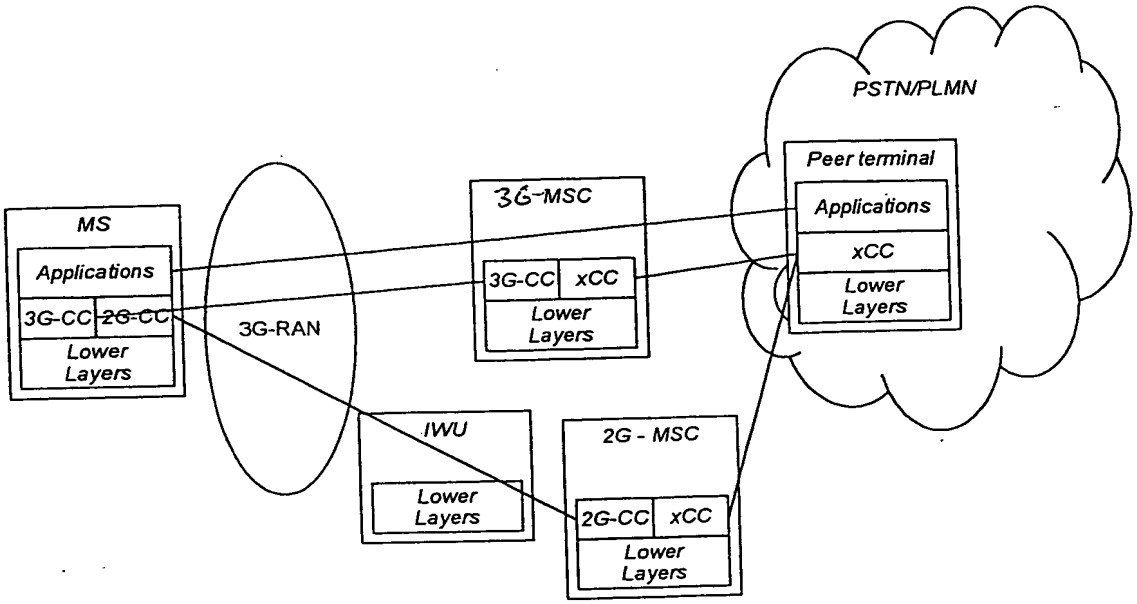

PSTN/PLMN
Peer terminal
Applications
xCC
Lower Layers
MS
Applications
3G-CC
2G-CC
Lower Layers
3G-RAN
3G-MSC
3G-CC
xCC
Lower Layers
IWU
Lower Layers
2G - MSC
2G-CC
xCC
Lower Layers

FIG. 2A

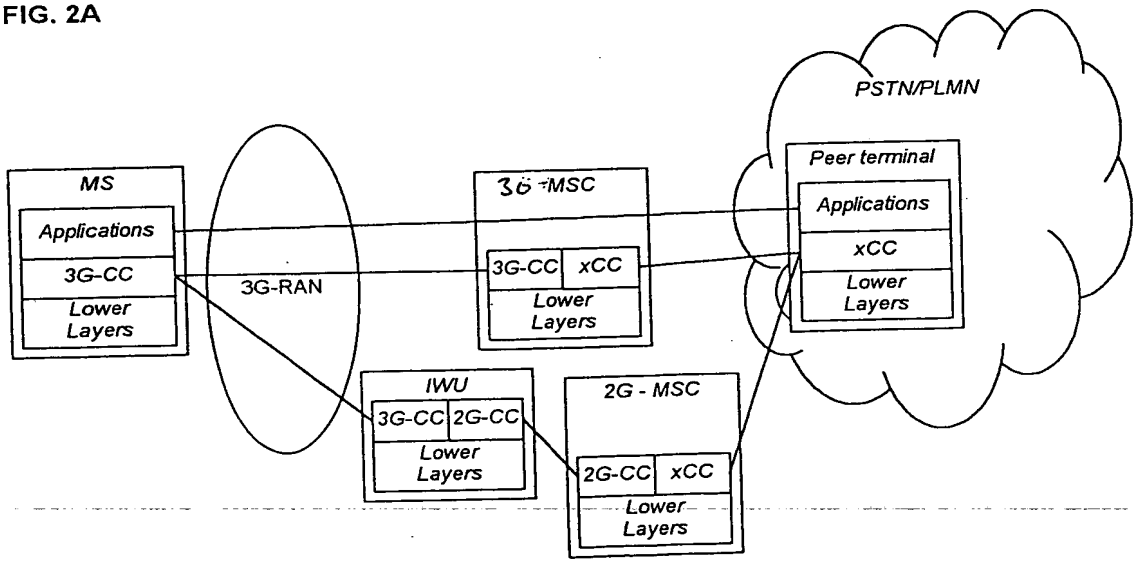

PSTN/PLMN
Peer terminal
Applications
xCC
Lower Layers
MS
Applications
3G-CC
Lower Layers
3G-RAN
3G-MSC
3G-CC
xCC
Lower Layers
IWU
3G-CC
2G-CC
Lower Layers
2G - MSC
2G-CC
xCC
Lower Layers

FIG. 2B

FIG. 3A

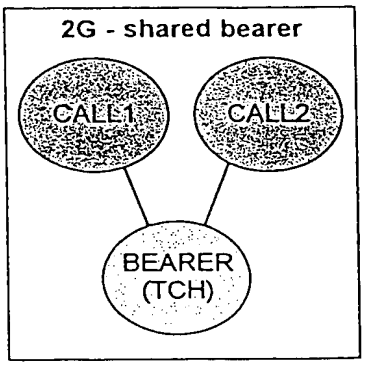
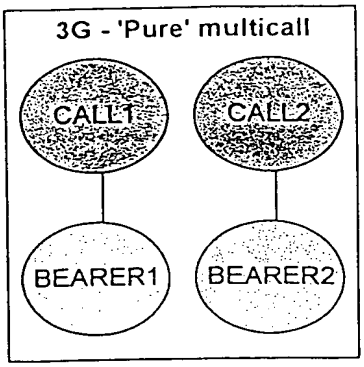


FIG. 3B



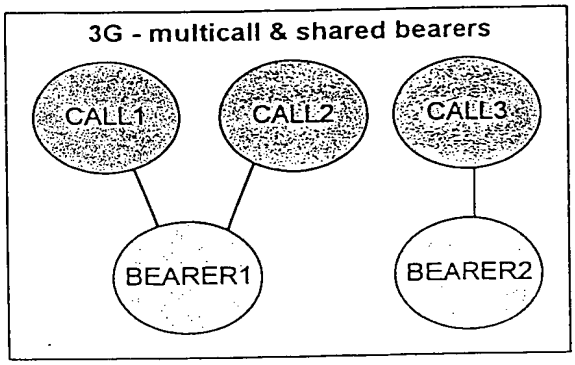


FIG. 3C

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